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Iochroma tubulosum and I. lanceolatum are I. cyaneum[1]

G. H. M. Lawrence, Bailey Hortorium
and John M. Tucker, Univ. of California, Davis

The genus Iochroma, a member of the Solanaceæ, the Nightshade family, was established by George Bentham in 1845. It is a genus of tropical American shrubs or small trees. Four of its sixteen species are grown in the warmer parts of the United States for their showy tubular flowers. The nomenclatural status of one blue-flowered species, well-known as Iochroma tubulosum or as I. lanceolatum, is the reason for this article.[1]

It was Bentham's study of the genus Habrothamnus that caused him to establish Iochroma as a distinct genus. He noted that the plant that John Lindley had named Habrothamnus cyaneus, collected near Loja, Ecuador, and probably by the German plant explorer, Karl Hartweg, was significantly different from other species of Habrothamnus. This Ecuadorian plant became the type of Bentham's new genus, Iochroma. Because the flowers are tubular, he gave the plant the name Iochroma tubulosum, ignoring - or dropping - Lindley's earlier epithet of cyaneum.

At that time there were no international rules of plant nomenclature, although the century-old rules proposed and followed by Linnæus were more or less respected. In 1905 the first international rules of nomenclature were adopted in Vienna. They provided for the retention of the original species-epithet of a plant, regardless of the genus in which it might be placed. The half-century since then has seen no change in this rule. Perhaps few of our large families of flowering plants have received so little monographic study as have the Solanaceæ, especially the tropical members. Iochroma is no exception to this observation. However, in 1926 Miss M. L. Green (now Mrs. T. A. Sprague) published a list of names proposed as type-species of a large number of genera. This was done in a mimeographed 70-page booklet issued from the Royal Botanic Garden at Kew under the title "Standard-species of Nomina Conservanda."

Under the Solanaceæ she listed (p. 54) the following item:

> 7382 IOCHROMA Benth. in Bot. Reg. t. 20 (1845) I. tubulosa Benth., (I. CYANEA (Lindl.) M. L. Green, comb. nov.) the historically oldest of the three species.

[1]The generic name Iochroma is from the Greek (meaning "violet-color") and is neuter in gender. Epithets in combination with it, then, also should be neuter in form and not feminine as they often, though incorrectly, are. Except as they appear in quoted passages, the endings are correspondingly changed in this account.

Although she cited here the name "I. cyanea (Lindl.) M. L. Green comb. nov.," meaning that the name Iochroma cyaneum was a new combination of her authorship, the new combination is illegitimate and invalid because she did not cite Lindley's binomial, Habrothamnus cyaneus, on which it was based. True, she did cite Lindley as a parenthetical author, but who would know, from this reference, under what generic name Lindley had described the species? This oversight appears to have been recognized by Miss Green because, preceding the index of the booklet (p. 63), she listed the item:

> 7382. Iochroma cyanea M. L. Green: Habrothamnus cyaneus.

However, neither one of these entries individually satisfies the technical requirements for publication according to the Code. The last one quoted above failed to give the authority for the basonym, Habrothamnus cyaneus. By inference, after comparing with the first of Miss Green's entries, one might correctly assume it to be Lindley. Assumptions, however, are not allowable. The correct name and proper citation of synonymy is:

Iochroma cyaneum (Lindley) M. L. Green, Standard-species of Nomina Conservanda, pp. 54 and 63 (1926), "cyanea."

Habrothamnus cyaneus Lindley in Botanical Register vol. 30, misc. 66 (1844).

Iochroma tubulosa Bentham in Botanical Register vol. 31, plate 20 (1845).

Chænesthes lanceolata Miers in Hooker's London Journal of Botany vol. 4: 239 (1845).

Iochroma lanceolata (Miers) Miers in Hooker's London Journal of Botany vol. 7: 347 (1848).

This note has been prepared because the junior author, of the Department of Botany, University of California at Davis, wrote Dr. L. H. Bailey in 1941, pointing out the apparent illegitimacy of the name Iochroma tubulosum, and the correctness of the name Iochroma cyaneum. Neither he nor Dr. Bailey had then seen Miss Green's mimeographed booklet, now a rarity to be found only in a few American botanical libraries. Miss Green's combination is cited in "Index Kewensis," but because of the general unavailability of the work which is the source of the name, and because of its questionable validity as published by Miss Green, the situation is reviewed here and the appropriate entries provided.

The Status of Iochroma lanceolatum

John Miers included in his genus, Chænesthes, five species based on collections by Humboldt and Bonpland (which they had named and described as species of Lycium), plus a sixth species based on an unnamed specimen in Hooker's herbarium (at Kew) from "Paramo de Quindui, Nova Granada (Goudot)." This sixth

specimen Miers named Chænesthes lanceolata. In his description he stated, "The corolla seems of a crimson color..." (London Journal of Botany 4: 239 [1845]). Meanwhile, Hooker had received seeds from the mountains of Quindio, Colombia, which produced flowering plants by 1847 and were then named by him Chænesthes lanceolata (Curtis' Botanical Magazine 78: plate 4338). However, the flowers of Hooker's plants were deep blue, not crimson as Miers had believed his to be. Hooker explained this apparent error as due to a change in corolla-color from blue to reddish in the drying process of the preserved specimens. Hooker also noted the close affinity between these plants and those of Bentham's Iochroma tubulosum.

A year later, following studies for the first time of specimens of Iochroma, Miers recognized the two genera as congeneric and merged Chænesthes under Iochroma (London Journal of Botany 7: 342, [1848]). When he made the new combination, Iochroma lanceolata, Miers observed (p. 347):

> Respecting this species, in addition to my former remarks, it may only be observed, that the corolla in shape and size, also resembles that of Iochroma tubulosa, and were it not for the colour of its flowers [i.e., of I. tubulosa], which are said to be of a pale yellow, some of the specimens might also be mistaken for that species. The berry, nearly altogether enclosed by the enlarged calyx, which splits on one side, also resembles that of the plant just mentioned. In some cases, the leaves are less lanceolate than in the specimen which I first saw and formerly referred to; they are sometimes much acuminate at each extremity, six inches long, and three inches broad, upon a petiole one inch in length.

It appears that Miers mistook the corolla-color as found in the dried Colombian specimen (reddish) available to him at Kew to be that of the corollas when fresh (actually, a deep blue). The specimens grown at Kew from seed, and identified as Chænesthes lanceolata by Hooker, originated from the same locality in Colombia as did the specimen named by Miers. This situation, plus the doubt of corolla-color in Miers' mind and the otherwise matching of essential features in the two collections, provides the basis for placing Iochroma lanceolatum in synonymy under I. cyaneum. Since, for some specimens, Miers relied solely on corolla-color to distinguish I. lanceolatum from I. tubulosum, and showed that the lanceolate character of the leaf-shape in I. lanceolatum varied in degree, there apparently exists no real basis for separating the taxa.

At present, according to Hortorium records, four domestic sources offer plants of this species under the name Iochroma lanceolatum, though there are none listing it as I. tubulosum. Persons growing these plants should be advised that the correct name for this species-complex is Iochroma cyaneum.

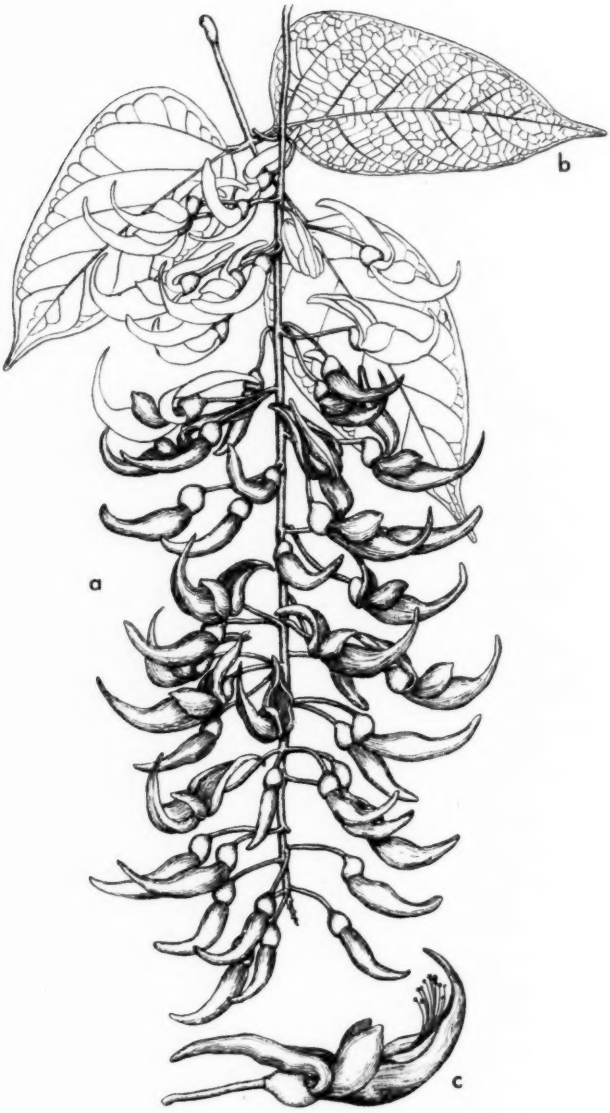

Fig. 22. Strongylodon macrobotrys: a, inflorescence x 1/4; b, leaf x 2/5; c, flower x 2/5. Original illustration by Arnulfo C. del Rosario.

Jade-vine from the Philippines

Juan V. Pancho
Department of Agricultural Botany
University of the Philippines

One of the most unusual ornamental vines in the Philippines is the Jade-vine (Strongylodon macrobotrys A. Gray), of the bean family (Leguminosæ). It is indigenous to the Philippines and was originally discovered in the dipterocarp forest of Mount Makiling, Luzon. It is becoming a popular ornamental vine in Philippine flower nurseries and in private gardens. In no time it will undoubtedly become one of the standard vines of the subtropical cultivated flora.

The inflorescence is racemose and the flowers are of a bluish-green shade, which is indeed one of the most unusual colors one can see in flowers. It blooms throughout the season in the mountains, its natural habitat. In nurseries and gardens, however, it flowers only from February to the early part of May.

The fruit is an indehiscent pod, fleshy and hard with comparatively few seeds. For maximum viability, the seeds should be planted immediately upon reaching maturity; attempts to keep them for a considerable length of time result in serious damage by weevils, consequently reducing the percentage of germination to its lowest. Once seeds germinate, one is sure to have beautiful bluish-green trusses of flowers by the third year and from there on the Jade-vine is a beautiful sight.

This species responds easily to marcotting and takes only a month to produce roots. Thus, the plant could be propagated asexually as equally well as by seeds.

Seeds may be obtained from the College of Forestry Nursery, University of the Philippines, Laguna, Philippines, or from the author. [Mr. Pancho's full address is: Department of Agricultural Botany, College of Agriculture, University of the Philippines, College, Laguna, The Philippines - Ed.]

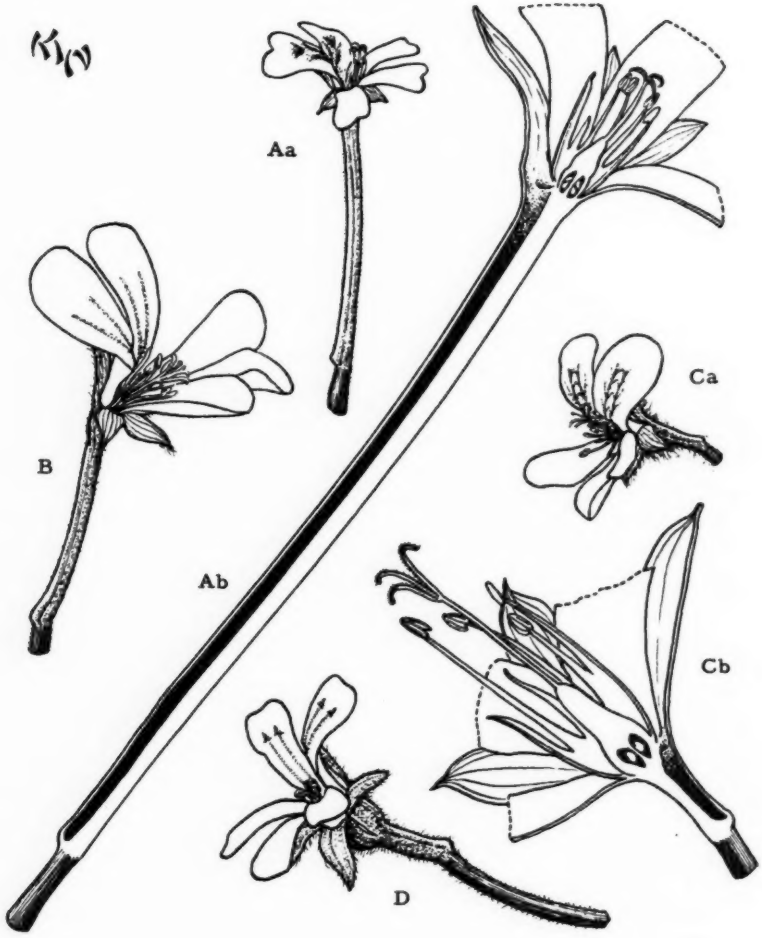

Fig. 23. A, Pelargonium echinatum: a, flower x 1; b, flower in vertical section x 3. B, P. peltatum; flower x 1. C, P. capitatum: a, flower x 1; b, flower in vertical section x 4. D, P. odoratissimum, flower x 4.

Pelargoniums in Cultivation. II.

Harold E. Moore, Jr.

III. A KEY TO GROUPS OF SPECIES

The identification of pelargoniums, whether from cultivation or from the wild, is not an easy matter. Keys in the detailed botanical studies are unwieldy, particularly so for the horticulturist who deals with only a portion of the approximately 300 known species. In the attempt to arrive at an understanding of cultivated pelargoniums, a simplified key to species listed in the trade was made and has been adopted here in the hope that it will prove useful to the pelargonium fancier. It is by no means certain that all the species listed in catalogues are actually in cultivation. In group IX, for example, it is probable that three of the four names mentioned are applied erroneously to plants not belonging to the species. Descriptions in "Hortus Second" or some other reference should be consulted in conjunction with the key.

At the outset, certain explanations are necessary. After a number of trials, a purely artificial key has been abandoned in favor of one which leads to groups of similar species. These groups are discussed and the species within them differentiated in part IV. In this manner, certain species that are easily recognized by some one outstanding character may be identified less quickly than in an artificial setting. Such difficulty may be offset by a more ready understanding of the several directions in which pelargoniums have developed.

Botanists and horticulturists alike distinguish between two major kinds of pelargoniums, those with large, woody, tuberous rootstocks and those with fibrous roots. Within these broad outlines, a great variety of habit, leaf-shape, and flower provides the means for separating species into groups. It is scarcely necessary to elaborate on the habit and leaves, for these follow standard patterns: herbaceous, shrubby, or vining stems and entire, palmately nerved or lobed to pinnately dissected leaves. Wherever possible, these characters have been utilized to assist in the identification of a plant not yet in flower. For exact identification, however, flowers are usually necessary and they provide less obvious but most important differences.

The one character that always distinguishes Pelargonium from its relatives in the family Geraniaceæ is the presence of a spur. This spur is not at all like the familiar spur of larkspur or columbine, but consists of a tube extending downward from the base of the uppermost sepal and fused to the pedicel or flower-stalk (fig. 23). At its base is a slightly swollen nectary. Most of the cultivated pelargoniums have either a long spur that is twice to several times the length of the sepals (fig. 23A,B), or a short spur that is one and one-half times as long as the sepals or less (fig. 23C, D). When all species of the genus are considered, this subdivision may not hold up, but it appears to work for cultivated material except where hybrids, such as P. × fragrans, are derived from parents of both long- and short-spurred types and are intermediate in the spur-length.

Groups of species in the key are arranged, in part, according to the type of spur. When flowers have long pedicels, the extent of the spur can be told by its swollen base and the relatively slimmer pedicel below it (fig. 23D). If question arises as to the length of the spur on flowers that are nearly sessile, a flower may be sliced lengthwise with a razor blade between the two upper petals. The spur will then appear as a tube on the upper side of the pedicel (fig. 23Ab). This may seem a difficult criterion to use, but a little practice in observing the differences noted in figure 23 may show its value.

To the specialist in pelargoniums, well versed in his materials, a key will be useful only for questionable plants. The beginner will find that a few species are immediately recognizable: P. gibbosum and some of its hybrids, by the strongly swollen joints (fig. 23b); P. echinatum and P. × Stapletonii, by the spine-like stipules on the stem (fig. 5); P. tetragonum, by its slender, 3- to 4-angled, bright green stem (fig. 34B). The remainder are less easily characterized. For the identification of plants not in flower, the following summaries may prove useful, at least in leading to the general relationship of the species. In each case, one salient feature of the leaf or stem is noted, for reference to a group in the key that follows and to groups in part IV.

Grouping of Species According to Leaf-characters

A. Leaves sweet-, spicy- or pungent-scented. . . . . Groups III, VI

B. Leaves white-hairy beneath. . . . . Groups III, IV, VI, VIII

C. Leaves pinnate or pinnately lobed. . . . . Groups I, II, V, VI
(Some species in Group III, although having palmately nerved leaves, are so dissected as to appear pinnate. They will be distinguishable from all but Group VI by their fragrance.)

D. Leaves palmately lobed. . . . . Groups III, VII, VIII, IX, X

E. Leaves entire or very shallowly lobed, generally rounded in outline. . . . . Groups IV, VII, X, XI

Fig. 24. Pelargonium rapaceum, adapted from Sweet, plate 135.

Fig. 25. Pelargonium pinnatum, adapted from L'Héritier, plate 8.

Grouping of Species According to Stem-characters

A. Stems absent (fig. 24, 25, 34Aa). . . . . Groups I, VII

B. Stem strongly 3-4-angled (fig. 34Ba, Bb). . . . . Group VII

C. Stem swollen at the joints (fig. 26b). . . . . Group II

D. Stem spiny (figs. 5, 38a). . . . . Groups VIII, XI

E. Stem thick, succulent, often more or less gnarled or misshapen, and usually short (figs. 5, 6, 26a, 31a, 32Aa, 38a). . . . Groups II, IV, V, VII, XI

In preparing the key that follows, however, it was assumed that the user would have flowering plants available. Wherever possible, living material has been used in checking the key. Such has not always been feasible and where errors or inconsistencies have crept in due to reliance on herbarium specimens or illustrations, the writer will appreciate comment. One species, Pelargonium paradoxum, has been offered for sale but is not keyed. It was originally described as having spatulate (spoon-shaped) entire leaves but is reported to show divided leaves at times in cultivation. No material has been available for study but it is apparently similar to species of Group V.

Three major categories of cultivated pelargoniums are mentioned here only in passing, for each in itself is a complex subject. Fancy-named clones of Pelargonium × domesticum (the florist's pelargonium or Martha Washington Pelargonium), of P. × hortorum (the garden, bedding, fish, or zonal geranium), and of P. peltatum (the ivy geranium) are so numerous as to defy any ordinary approach in the form of a key. Plants belonging to P. × domesticum will generally key to Group III (from species of which they have largely been derived), those of P. × hortorum and P. peltatum to group X.

A Key to Groups of Cultivated Pelargoniums

1. Rootstock large, woody, and tuberous-thickened (fig. 25): plants stemless or producing annual herbaceous branches from an often short perennial stem.

   2. Stems absent: leaves all borne in a rosette from the crown (figs. 24, 25). . . . . Group I (p. 79)

   2. Stems present but often short and thick; leaves borne on annual herbaceous branches (fig. 26). . . . . Group II (p. 81)

1. Rootstock fibrous, not tuberous-thickened: plants ordinarily with well-developed perennial stems.

   3. Flowers short-spurred, the spur 1 1/2 times as long as the sepals or less (fig. 23 Ca, D).

      4. Stems slender, herbaceous or woody: leaves generally sweet-, spicy- or pungent-scented (figs. 2 to 4, 8 to 10, 12 to 15). . . . . Group III (p. 81)

Fig. 26. Pelargonium gibbosum: a, habit, adapted from Sweet, plate 61; b, node x 1.

4. Stems thick, succulent, generally short and often gnarled (figs. 31a, 32Aa).

5. Leaves entire, densely white-hairy beneath (fig. 31). . . Group IV (p. 88)

5. Leaves pinnate or pinnately lobed, not white-hairy beneath (fig. 32). . . . . Group V (p. 88)

3. Flowers long-spurred, the spur twice as long as the sepals or more (fig. 23Aa, B).

6. Leaves pinnately divided; stipules minute (fig. 33). . . . . Group VI (p. 88)

6. Leaves palmately nerved or lobed; stipules well developed (figs. 35, 36).

7. Upper petals very large, long-clawed, lower petals small and not or scarcely exceeding the sepals in length (fig. 34Ab, Bc). . . . . Group VII (p. 89)

7. Upper petals not more than twice as long as the prominent lower ones (figs. 35A, 38b).

8. Lower surface of leaf densely white-hairy. . . . . Group VIII (p. 91)

8. Lower surface of leaf green.

9. Leaves deeply 3- to 5- to 7-lobed beyond the middle, the lobes sharply toothed (figs. 7, 11). . . . . Group IX (p. 91)

9. Leaves not lobed beyond the middle, the lobes or margins with shallow and usually rounded teeth or without teeth (figs. 35, 36, 37, 38).

10. Blade of the leaf 2 cm. long or more: stems slender to moderately stout, vine-like or erect, not armed with persistent stipules (figs. 36, 36, 37). . . Group X (p. 93)

10. Blade of the leaf 10 mm. long or generally less: stems thick and low, armed with more or less persistent stipules on the branches (fig. 38). . . . Group XI (p. 96)

IV MAJOR GROUPS OF CULTIVATED SPECIES

Since the time of Willdenow, Sweet, and DeCandolle, botanists have tried to arrange the species of Pelargonium in groups that were easily recognizable. For all its long history as a popular genus in cultivation, Pelargonium has been surprisingly neglected by botanists, and the sections or groups of supposedly related species accepted by the two most detailed studies, those of Harvey in 1860 and of Knuth in 1912, are most difficult to define. Harvey wrote in "Flora Capensis" p. 260,

> For convenience of study the species are grouped, according to what appears to be their natural affinities, into fifteen sections, depending on several characters, either of habit or floral structure. I have not found it easy to affix exact definitions to them, and must, therefore, recommend the following abstract [of the 15 sections] to the careful study of the student. After he has become acquainted with one or two typical species of each section, he will find but little difficulty in associating others with them.

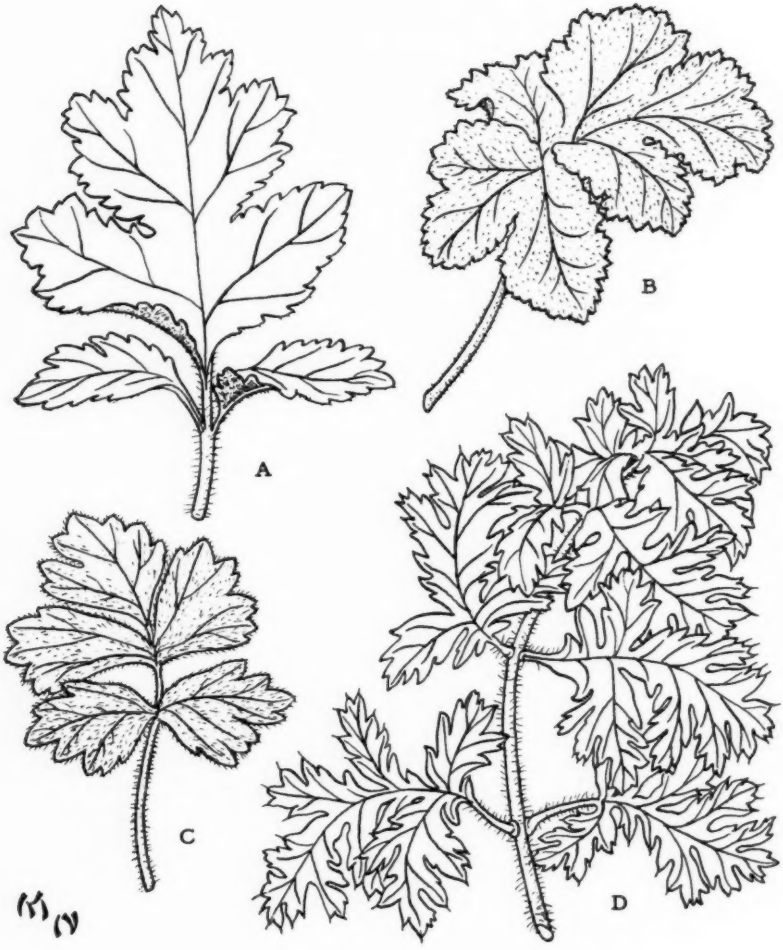

Fig. 27. A, Pelargonium ×glaucifolium, leaf, adapted from Sweet, plate 279. B, P. bicolor, leaf, adapted from Botanical Magazine, plate 201. C, P. fulgidum, leaf, adapted from Sweet, plate 69. D, P. ×rutaceum, leaf, adapted from Sweet, plate 279.

The fifteen sections adopted by Harvey were continued by Knuth with little evidence of critical study or attempt to modify them. It seems quite possible that a considerable improvement over the existing system could be devised if one were given time and adequate experience with the genus in the herbarium and in the field. The task is one that should be rewarding to any student interested in the evolution of plants, for there are many diverse ways in which Pelargonium appears to have adapted itself to its often difficult conditions.

The pelargonium fancier is generally more interested in the immediate problem of identification than in the intricate problems of relationship. Indication of relationship can, however, be useful from all points of view for the gardener recognizes scented-leaved pelargoniums (most of which are closely related) as a unit, and in similar fashion deciduous, succulent or cactus pelargoniums, zonal pelargoniums, ivy pelargoniums, etc. The grouping that follows is a compromise between the loosely defined botanical sections, some of which appear to be unnatural in themselves, and the popular garden classification. Groups dealt with here are correlated with their botanical sectional counterparts.

Group I

A study of the literature dealing with pelargoniums shows that an astonishing array of tuberous-rooted, stemless species belonging to the botanical section Hoarea have been cultivated at one time or another. That so few have persisted may be due to several factors. They are more difficult to propagate than most, they appear to be more exacting in their cultural requirements, and they are dormant for a good part of each year.

Very few of the Hoarea pelargoniums are now grown although many were illustrated from plants grown in England a century or more ago. There are some 50 or more wild species in South Africa, many of which would be most ornamental if reintroduced. The entire to very much divided and lacy leaves are borne annually in a rosette from the crown with the umbels rising directly from it. Flowers are usually long-spurred and frequently brightly colored. P. pinnatum and P. rapaceum are occasionally grown in the United States by collectors. Unidentified or as yet unlisted species of this sort are currently being grown in California but are not generally available.

Two species mentioned have been confused, for the name P. rapaceum has been applied to an entirely different plant as noted

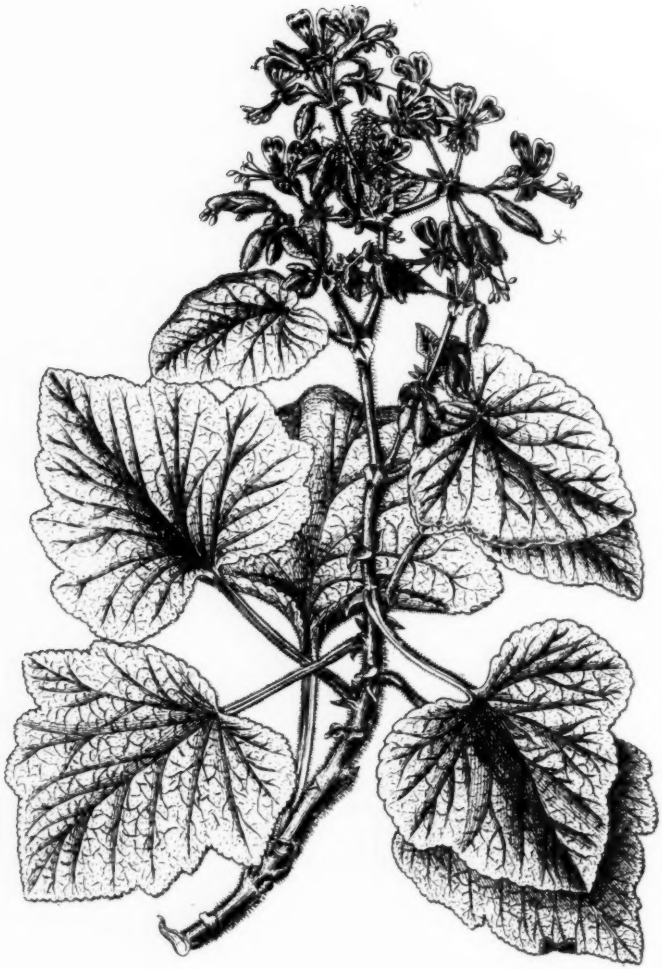

Fig. 28. Pelargonium papilionaceum, adapted from Dillenius, Hortus Elthamensis, plate 155.

previously (p. 41), and P. pinnatum was introduced erroneously as P. squarrosum. They are separated as follows:

1. Lower petals held close together (connivent), the upper petals reflexed and the whole flower resembling a miniature sweet pea; leaves pinnately divided into slender segments (fig. 24). . . . . P. rapaceum

1. Petals all spreading; leaves with few to many broadish-ovate segments in pinnate arrangement (fig. 25). . . . . P. pinnatum

Group II

Tuberous roots, generally pinnate leaves, and long-spurred flowers that are often fragrant in the evening are typical of the pelargonium species grouped here. Botanically they belong in the section Polyactium. Sometimes stems are well-developed, as in P. fulgidum, or swollen, as in P. gibbosum, but the usual species have short perennial stems that produce more or less herbaceous annual flowering branches. Dull yellow, greenish-yellow, or very deep red-black flowers have provided some unusual color combinations in hybrids such as P. × glaucifolium, and P. × rutaceum where the center of the petals is almost black, the margin yellow. Two-toned effects are seen in P. bicolor and P. apiifolium while bright scarlets appear in hybrids derived from the striking P. fulgidum. A few species, none of them presently known in the United States, have deeply fringed petals. Except for P. fulgidum or its derivatives and P. gibbosum, the Polyactium pelargoniums are rare.

1. Flowers greenish-yellow throughout. . . . . P. gibbosum

1. Flowers in various shades of red to purple.

2. Petals deep maroon or purple, often appearing black, margined with greenish-yellow.

3. Upper petals spotted with greenish-yellow at base: leaves bipinnate, the leaflets separated along the rachis (fig. 27D). . . . . P. × rutaceum

3. Upper petals not spotted at the base; leaves 3-lobed to pinnately lobed but not pinnate (fig. 27A). . . . . P. × glaucifolium

2. Petals without a marginal band, or margined in pale red or purple.

4. Petals margined in pale purple.

5. Leaves lobed to the midrib. . . . . P. apiifolium

5. Leaves not lobed so far as the midrib (fig. 27B). . . . . P. bicolor

4. Petals scarlet, not margined in another color. . . . . P. fulgidum (and its derivatives, P. × ignescens and 'Scarlet Unique')

Group III

Most perplexing of the cultivated pelargoniums are those that are grown for their scented leaves, all of which are considered here with the exception of P. abrotanifolium (Group VI). In the botanical scheme, these species are distributed through three sections, Peristera, Cortusina, and Pelargonium, with the majority falling in the last. The limits of these sections are far from clear. From a practical point of view they may be considered together here and further study may show that in large part they also belong together botanically.

Fruity, spicy, or pungently scented foliage is the common criterion by which these species are recognized. They also have

short-spurred flowers (except for the intermediate hybrid P. × fragrans), relatively slender, herbaceous to woody stems, and palmately nerved or lobed leaves. Sometimes the stems are low and densely leafy, forming a compact rosette-like plant, as in P. odoratissimum. More often they are nearly erect to very stiffly so, as in P. crispum. Flowers vary from the smallest of the whole genus to very nearly the largest and in a range of color from white to deep magenta. The upper petals are usually splotched and veined with a color deeper than that of the blade.

Many species are identifiable by their scent. Since there is not always agreement as to the descriptive term for scents, the character is not used here. Some of the usual categories with examples are:

Rose - P. graveolens, P. capitatum, and their forms
Lemon - P. crispum and derivatives
Peppermint - P. tomentosum
Pine - P. denticulatum
Apple - P. odoratissimum
Apricot - P. 'M. Ninon'
Coconut - P. grossularioides
Nutmeg - P. ×fragrans
Pungent - P. quercifolium, P. radens

A great variety of selected clones and hybrids of known or unknown parentage further complicates the making of a key. To include all of them is difficult if not impossible, hence only the species themselves are noted here. In addition to those with strongly scented foliage, there are some large and handsome species lacking in pronounced odor. The florist's pelargonium, Pelargonium ×domesticum, has largely been derived from these, including Pelargonium angulosum, P. cucullatum, and several other species.

Some of the problems of names used erroneously for plants of this group have been discussed earlier (pp. 25, 41-43). It should be noted that the name of the clone often grown as P. scabrum and mentioned on page 43 was inadvertently misspelled in the final stages of preparing that page for publication. The name should have read Pelargonium 'M. Ninon' rather than P. 'M. Minor'.

1. Lower petals shorter than sepals, white; upper petals twice as long as sepals or more, pink splotched with bright red-purple (fig. 29B). . . . . P. papilionaceum

1. Lower petals longer than the sepals (fig. 29A).

2. Leaves densely white-hairy below, especially when young.

3. Flowers white; leaves 3- to 5- to 7-lobed. . . . . P. tomentosum

3. Flowers pink or only the narrow lower petals pale; leaves heart-shaped (fig. 4). . . . . P. cordifolium

2. Leaves green below.

4. Flowers very small, the sepals mostly 5 mm. long or less, the petals seldom exceeding 10 mm. in length; low, sprawling, herbaceous species or slender shrubs with herbaceous branches.

5. Spur of the calyx 1 to 2 mm. long. . . . . P. australe

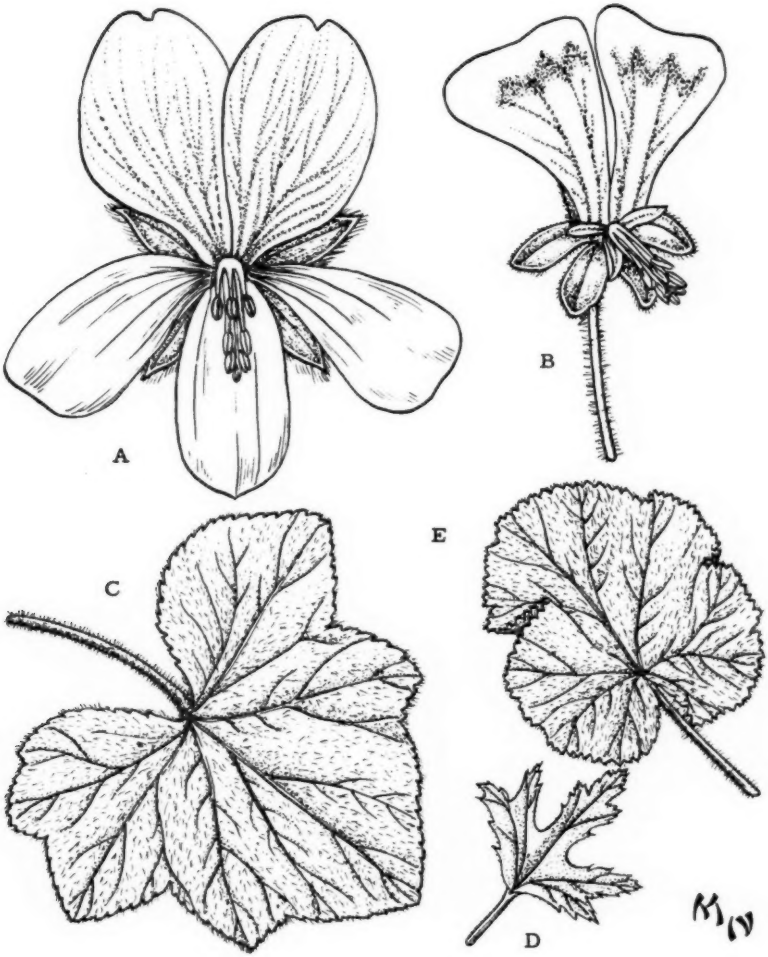

Fig. 29. A, Pelargonium cucullatum, flower x 2. B, P. papilionaceum, flower x 2. C, P. tomentosum, leaf x 4/5. D, P. scabrum, leaf x 4/5. E, P. capitatum, leaf x 4/5.

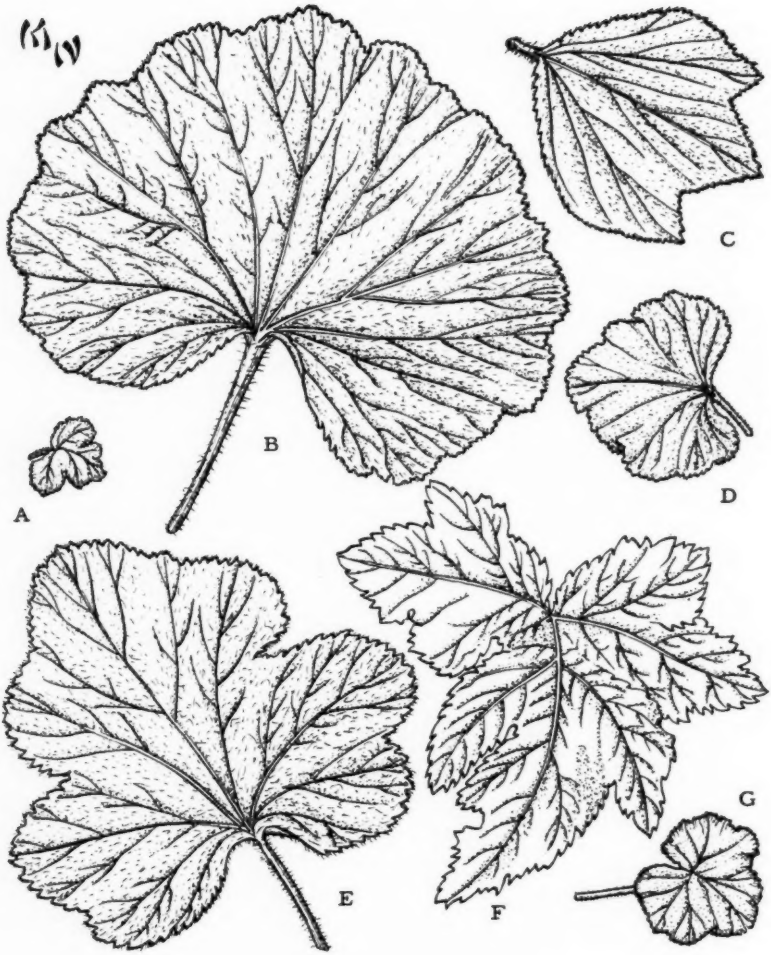

Fig. 30. A, Pelargonium crispum, leaf x 4/5. B, P. cucullatum, leaf x 4/5. C, P. angulosum, leaf x 4/5. D, P. australe, leaf x 4/5. E, P. vitifolium, leaf x 4/5. F, P. glutinosum, leaf, adapted from L'Héritier, plate 20. G, P. odoratissimum, leaf x 4/5.

5. Spur of the calyx 4 mm. long or more.

6. Petals deep red (fig. 14). . . . . P. grossularioides

6. Petals white or pale pink, lined with red. . . . . P. odoratissimum

4. Flowers larger, the sepals mostly 7 mm. long or more, the petals 12 mm. long or more: branched, shrubby species.

7. Leaves small or very small, seldom more than 2 cm. long, 1 1/2 cm. wide, 3-lobed, the margin strongly crisped, smelling of lemon or lime (fig. 30A). . . . . P. crispum

7. Leaves larger, with lobed or toothed but not crisped blades, not lemon-scented but often fragrant or pungent-, mint-, rose-, or aromatic-scented.

8. Base of the leaf cuneate (wedge-shaped) (figs. 2, 29D, 30C).

9. Upper petals 25 to 30 mm. long, deep red-purple: leaves angled but not or only slightly lobed (fig. 30C). . . . . P. angulosum

9. Upper petals 20 mm. long or less: leaves lobed.

10. Leaves lobed to the middle, pubescent above (fig. 2). . . . . P. acerifolium

10. Leaves lobed 2/3 to nearly to the base, glabrous above (fig. 29D). . . . . P. scabrum

8. Base of the leaves cordate (heart-shaped) (fig. 30B, E, F).

11. Blades of the leaf reniform - cordate, more or less cupped, not or only shallowly lobed; petals 20 to 30 cm. long, red with deeper veins (figs. 29A, 30B). . . . . P. cucullatum

11. Blades of the leaf distinctly lobed or divided, flat; petals mostly 20 cm. long or less, pink, veined and splotched with red.

12. Leaves divided to the middle or less into 3 to 5 broad, blunt lobes (figs. 29E, 30E); blades densely and softly hairy on both sides: flowers sessile, numerous, in a dense umbel.

13. Leaves softly hairy: stems lax and tending to trail. . . . . P. capitatum

13. Leaves harshly hairy: stems more or less erect. . . . . P. vitifolium

12. Leaves divided beyond the middle into rather narrow lobes (figs. 8-10, 12, 15, 30F); blades smooth, sticky, or roughly hairy (softly hairy in P. graveolens) at least on the upper surface: flowers more or less pedicellate in rather loose umbels.

14. Lobes of the leaves not strongly toothed, the blade often with dark markings along the veins.

15. Tips of lobes rounded (fig. 10). . . . . P. quercifolium

15. Tips of lobes acute (fig. 30F). . . . . P. glutinosum

14. Lobes of the leaves strongly and sharply toothed.

16. Petals notched at the tip: upper surface of the leaf glabrous, viscid (fig. 15). . . . . P. denticulatum

Fig. 31. Pelargonium cotyledonis, habit, adapted from L'Héritier, plate 27.

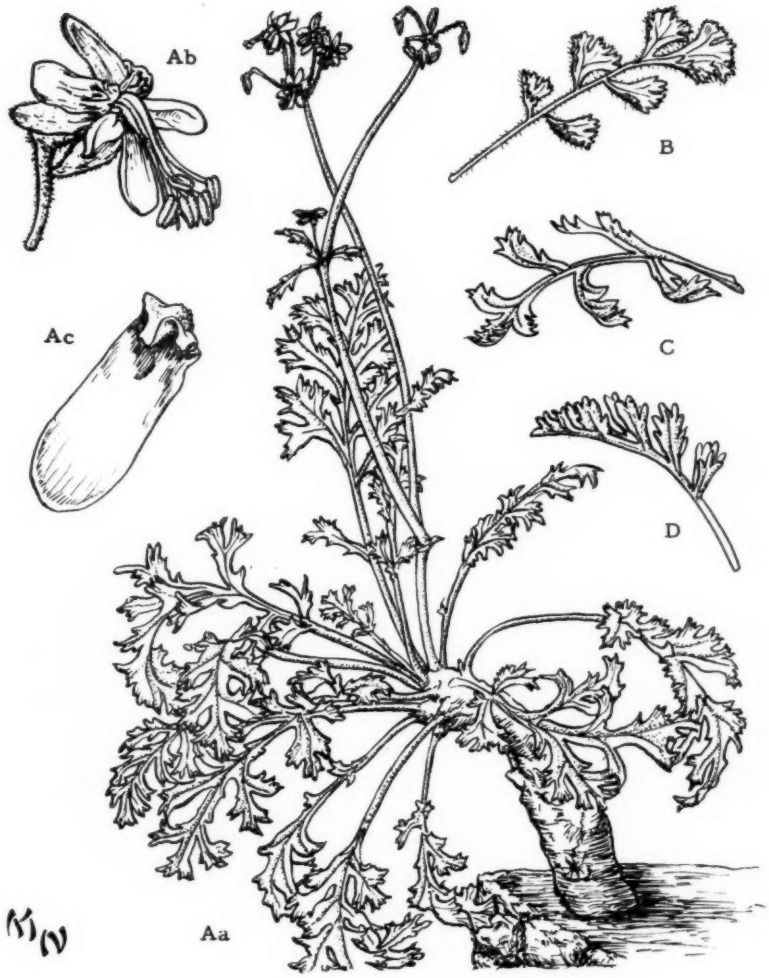

Fig. 32. A, Pelargonium carnosum: a, habit x 2/5; b, flower x 2; c, base of upper petal x 4. B, P. alternans, leaf x 4/5. C, P. crithmifolium, leaf, adapted from Das Pflanzenreich. D, P. dasycaule, leaf, adapted from Botanical Magazine, plate 2029.

16. Petals entire at the tip: upper surface of leaf pubescent, not viscid.

    17. Margins of the leaves rolled under, the lobes very deeply divided into narrow segments with short, stiff, rasp-like hairs on both surfaces (fig. 12). . . . . P. radens

    17. Margin of the leaves not rolled under, the lobes rather shallowly toothed with soft slender hairs on both surfaces (figs. 8, 9). . . . . P. graveolens

Group IV

Only one species, the rarely grown Pelargonium cotyledonis from the Island of St. Helena, falls in this group. Knuth failed to mention it although L'Heritier had described and illustrated plants before 1800. Pelargonium cotyledonis does not fit well into any of the botanical sections but most closely resembles the species listed under group VIII. Like them, it has thickish stems and leaves that are densely white-hairy beneath. Unlike them, the leaves are scarcely divided and the nearly regular white flowers have an extremely short spur (fig. 31).

Group V

For fanciers of succulents, a few species of the small group known botanically as section Otidia are a rewarding addition to collections. Although not frequently grown, they fit well with a collection of Crassulaceæ, Euphorbiaceæ, Cactaceæ or other desert types. Four species are sometimes listed in the United States. All are conspicuous for their short to medium, thick, gnarled, succulent or woody stems, deciduous pinnate leaves, and pale, short-spurred flowers of moderate size. The upper petals are unusual for the way in which the outer margins are very abruptly narrowed to a short, slender base, giving somewhat the effect of an ear (fig. 32Ac).

1. Leaves with wedge-shaped leaflets (fig. 32B). . . . . P. alternans

1. Leaves with the divisions oblong-linear to ovate, not wedge-shaped.

    2. Peduncles 2 1/2 to usually many times as long as the pedicels (fig. 32Aa). . . . . P. carnosum

    2. Peduncles as long as or up to twice as long as the pedicels.

        3. Lobes of the leaves oblong-linear, the tips pinnately toothed with spreading segments (fig. 32C). . . . . P. crithmifolium

        3. Lobes of the leaves oblong or ovate, the tips blunt and 3-toothed (fig. 32D). . . . . P. dasycaule

Group VI

Pelargonium abrotanifolium is the only species in general cultivation that falls into this group, corresponding to the botanical section Ligularia. In this section there is a diversity of habit and it is difficult to characterize readily. Pelargonium abrotanifolium (fig. 33), however, is noteworthy for its very minute stipules, feathery grey-green leaves, and long-spurred white to rose-purple flowers. The slender, woody stems are graceful and crowded with pleasantly fragrant leaves resembling those of southernwood (Artemisia Abrotanum), from which it takes its name.

Fig. 33. Pelargonium abrotanifolium: a, habit x 4/5. b, leaf x 2.

Group VII

The two cultivated species that are included here are striking because the two upper petals of the long-spurred flowers are very large in contrast to the extremely short lower ones (fig. 34). Indeed, at a casual glance the flowers appear to have only two petals. It is this unusual character of the flower that has been taken as the basis for putting the two species together in the small section Jenkinsonia. In habit, the two are strikingly different as noted in the separation below. Pelargonium tetragonum is a species of South Africa, while P. Endlicherianum is an herbaceous perennial, na-

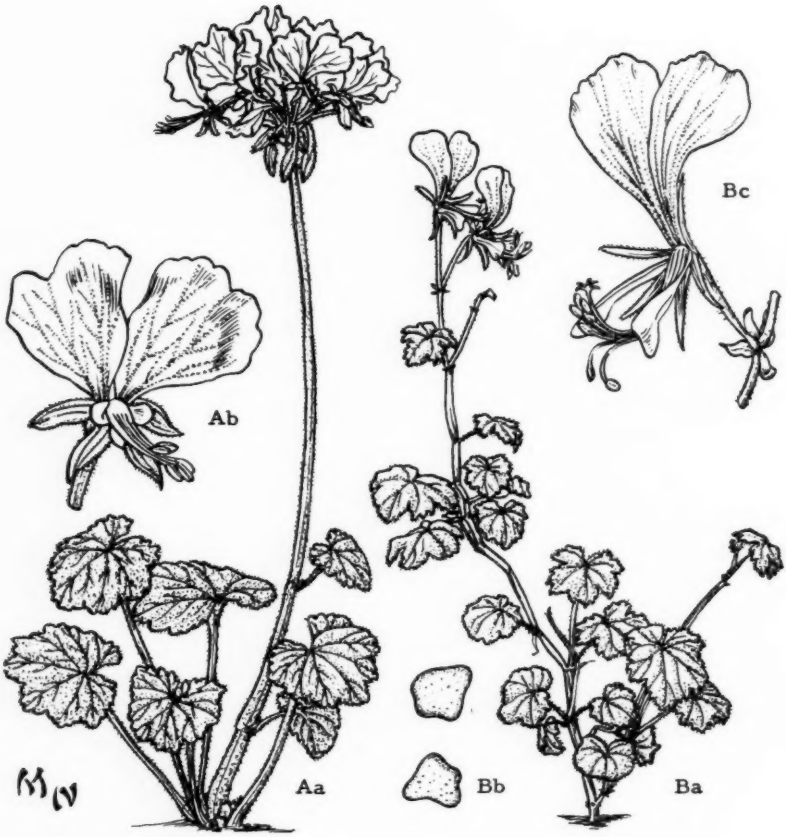

Fig. 34. A, Pelargonium Endlicherianum: a, habit x 1/4; b, flower x 4/5. B, P. tetragonum: a, habit x 1/4; b, stem in cross-section x 1 3/5; c, flower x 4/5.

tive in Asia Minor and hardy in parts of Europe and the United States. Of two other species sometimes thought to be related here, one is poorly known and the other, P. præmorsum, is here included with Group IX.

1. Stems 3- to 4-angled, fleshy, tall and perennial (fig. 34B). . . .P. tetragonum

1. Stems not angled, herbaceous, low and annual from a basal rosette of leaves (fig. 34A). . . . . .P. Endlicherianum

Group VIII

Three species and a hybrid resembling one another in having densely white-hairy under-surfaces on the leaves and the long-spurred flowers borne on a special stem fall here. Botanically, they belong in the section Cortusina, a section which is also made to include some quite different species. One of the latter, P. odoratissimum, has been listed with other scented-leaved pelargoniums in Group III where it seems more at home.

Neither P. echinatum (the sweetheart or cactus pelargonium), P. crassicaule, nor P. reniforme are noted for their scent but each is distinctive in its own way. Pelargonium echinatum and its derived hybrid, P. × Stapletonii, are succulent types remarkable for their spiny stipules. Pelargonium reniforme, a sprawling but attractive species, bears its red-purple flowers in profusion on a stem that is sometimes more than a foot long.

1. Stems without persistent spiny stipules; flowers red-purple. . . P. reniforme
1. Stems spiny with persistent stipules, at least at the tip; flowers white to purplish.
   2. Leaf-blade decurrent, gradually narrowed to the petiole; stems short and very thick, spiny at the tips (fig. 6). . . . . P. crassicaule
   2. Leaf-blade not decurrent, abruptly narrowed to the petiole; stems tall, thick and usually spiny for much of their length (fig. 5).
      3. Petals white or purplish, only the two upper spotted with red. . . . . P. echinatum
      3. Petals cerise or rose, the upper two white at the base, all 5 spotted with red. . . . . P. × Stapletonii

Group IX

Although four species belonging to the section Eumorpha are considered here, it is doubtful that more than one of them are actually grown in the United States. Plants bearing the name P. grandiflorum are apt to be large-flowered hybrids of the P. × domesticum type. The name P. alchemilloides is sometimes used for plants that are hybrids of the P. zonale alliance. Recently, P. patulum has been offered for sale but it is suspected that the species so grown is actually P. præmorsum. The last species, though placed by Knuth in the same section as P. tetragonum and P. Endlicherianum (Group VII), seems much more like others of the present group which are characterized by slender woody stems, deeply lobed, sharply toothed, green or zoned leaves, and long-spurred flowers.

1. Flowers yellow or creamy-yellow lined with red: leaves very deeply divided, the lobes with truncate tips (fig. 11). . . . . P. præmorsum
1. Flower white or pink.
   2. Upper surface of leaf not zoned with red, glaucous and glabrous; petals up to 35 mm. long, white, the upper two veined with violet (fig. 7). . . . . P. grandiflorum
   2. Upper surface of leaf zoned with red; petals less than 25 mm. long.
      3. Leaves glabrous. . . . . P. patulum
      3. Leaves pubescent. . . . . P. alchemilloides

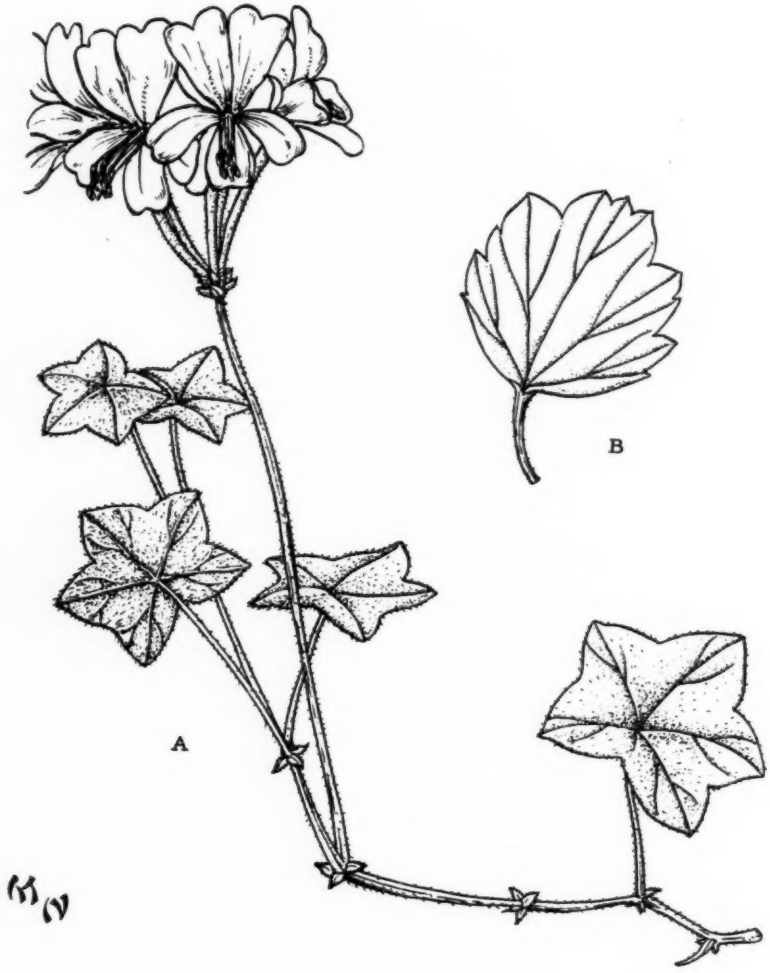

Fig. 35. A, Pelargonium peltatum, habit x 4/5. B, P. acetosum; leaf x 4/5.

Group X

Knuth, in his monograph of 1912, separated the species of this group into two sections, Dibrachya and Ciconium, placed apart from each other in his sequence. For several reasons it seems desirable to consider them together here. In general aspect the cultivated species assigned to Dibrachya (P. peltatum and the somewhat doubtfully cultivated P. lateripes) have much in common with species of section Ciconium. The long-spurred flowers are very similar in structure and appearance, the semi-succulent stems at length become woody, and there is not so clear a demarcation between the trailing or hanging stems of P. peltatum and the sprawling to erect stems of such species as P. Burtoniæ and P. frutetorum as one would like. All have prominent stipules and leaves that are less deeply divided than many in the genus. Hybrids between P. peltatum and P. × hortorum are obtained with fair readiness, suggesting a close genetic relationship. Pelargonium acetosum, placed by Knuth in section Ciconium, certainly shows close affinity to P. peltatum.

From the species of Group X two of our major groups of cultivated pelargoniums have evolved. The ivy geraniums are closely akin to the wild species P. peltatum, and the diversity of leaf and flower has probably arisen through selection in cultivation from a basically variable wild stock with relatively little hybridization. Pelargonium × hortorum, the garden, bedding, fish, or zonal geranium, has been largely derived from hybridization between P. inquinans and P. zonale, with the possible infusion of characters from a few other species. Through constant crossing and selection, hundreds upon hundreds of fancy-named clones have been developed. In general, P. × hortorum differs from the wild species in a more regular flower with broader petals, though exceptions such as the cactus-flowered cultivars are noted. The natural zoning of the leaf has been intensified in cultivation until now there are clones with three or more colors in various patterns.

In addition to the commonly cultivated forms, most of the wild species are or have been known in cultivation. True P. inquinans and P. zonale are perhaps less frequent than lists might suggest but attractive novelties are found in P. Burtoniæ, P. frutetorum, P. salmoneum, and P. acetosum. The last is unusual in having an acid taste to the leaf much like that of sorrel, hence its name. A leaf cut into a salad adds piquancy and interest. In its habit, too, it is unusual for, although forming a compact bush in the wild, the slender stems tend to elongate and sprawl or hang in cultivation as do those of P. peltatum. Pelargonium scandens is not included in the key. As yet no material corresponding to the description of the true species has been seen; the so-called P. scandens of our greenhouses belongs in this group and the material that has been seen is very close to true P. zonale.

Fig. 36. Pelargonium lateripes, adapted from L'Héritier.

Fig. 37. A, Pelargonium Burtoniæ, habit x 4/5; B, P. frutetorum, leaf, adapted from Hooker's Icones Plantarum, plate 3200. C, P. zonale, leaf from specimen in Linnæan Herbarium. D, P. inquinans, leaf from specimen in Linnæan Herbarium. E, P. salmoneum, leaf, adapted from Botanical Magazine, plate 9357.

Attempting to provide a key to species in this group is more of an exercise than a useful pursuit. Until the species have been studied with care in their native home they can scarcely be understood in cultivation. The apparent readiness with which some of them hybridize leads one to suspect any plant not directly descended from cuttings or seed obtained in the wild. Descriptions, photographs of type-specimens in the Linnæan Herbarium, and authenticated specimens from South Africa have been relied on rather than living plants of doubtful status. While one of the differences between species of sections Dibrachya and Ciconium is supposedly the lack of more deeply colored veins in upper petals of the latter section, such a distinction has not been used here. The principal reason is that in P. acetosum, P. salmoneum, and quite possibly in some of the remaining species, the petals are rather prominently veined.

1. Leaves peltate, prominently 5-angled or 5-lobed (fig. 35A). . . . P. peltatum
1. Leaves not peltate.
   2. Base of the leaf-blade wedge-shaped (fig. 35B). . . . . P. acetosum
   2. Base of the leaf blunt or heart-shaped.
      3. Leaves strongly 5-angled and lobed (fig. 36). . . . . P. lateripes
      3. Leaves rounded in outline.
         4. Pedicel and spur glabrous or thinly hairy but not glandular when seen through a hand lens.
            5. Petals very slender and sharply pointed at the tip, deep red (fig. 37A). . . . . P. Burtoniæ
            5. Petals moderately slender but rounded at the tip, pink (?). . . . . P. zonale
         4. Pedicel and spur densely glandular and hairy.
            6. Flowers deep red. . . . . P. inquinans
            6. Flowers salmon-pink.
               7. Leaves softly and more or less densely hairy, prominently zoned (fig. 37B). . . . . P. frutetorum
               7. Leaves minutely glandular and thinly hairy, not zoned but often more or less glaucous (fig. 37E). . . . .P. salmoneum

Group XI

The single species P. xerophyton (fig. 38) should key out here. It is a low, woody, much-branched pelargonium with tiny, more or less wedge-shaped leaves about 8 mm. long or perhaps somewhat larger in cultivation. The short branches are often somewhat spiny and bear solitary, long-spurred flowers at their tips. Botanically it has been included in the same section as P. abrotanifolium, but differs considerably from that species. Pelargonium xerophyton is not well-known and may not be cultivated outside special collections in the United States.

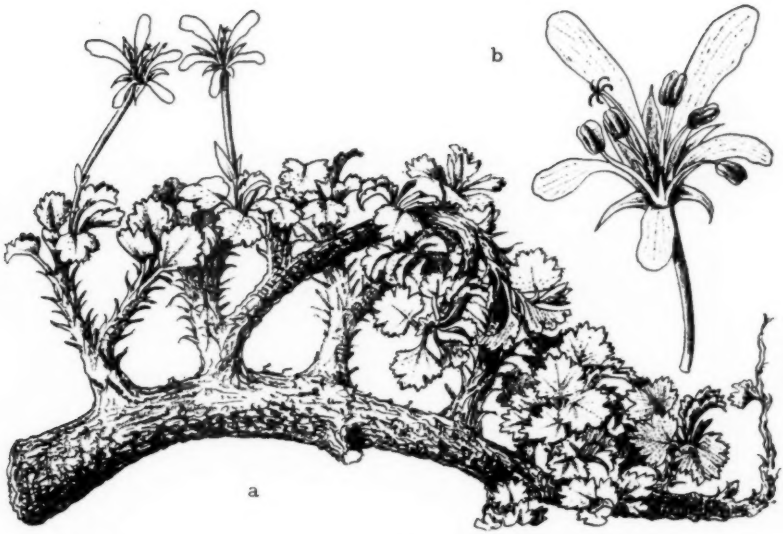

Fig. 38. Pelargonium xerophyton, adapted from Das Pflanzenreich: a, habit; b, flower.

FINDING LIST OF CULTIVATED SPECIES OF PELARGONIUMS

	Group
abrotanifolium	VI
acerifolium	III
acetosum	X
alchemilloides	IX
alternans	V
angulosum	III
apiifolium	II
australe	III
bicolor	II
Burtoniæ	X
capitatum	III
carnosum	V
cordifolium	III
cotyledonis	IV
crassicaule	VIII
crispum	III
crithmifolium	V
cucullatum	III
dasycaule	V
denticulatum	III
echinatum	VIII
Endlicherianum	VII
frutetorum	X
fulgidum	II
gibbosum	II
× glaucifolium	II
glutinosum	III
grandiflorum	IX
graveolens	III
grossularioides	III
inquinans	X
lateripes	X
odoratissimum	III
papilionaceum	III
patulum	IX
peltatum	X
pinnatum	I
præmorsum	IX
quercifolium	III
radens	III
rapaceum	I
reniforme	VIII
× rutaceum	II
salmoneum	X
scabrum	III
× Stapletonii	VIII
tetragonum	VII
tomentosum	III
vitifolium	III
xerophyton	XI
zonale	X

Note: In the checklist of Pelargoniums, pp. 43-46, the following changes should be made:

capitatum	to	*capitatum
× denticulatum	to	*denticulatum
× domesticum	to	*× domesticum
× frutetorum	to	frutetorum
palpilionaceum	to	papilionaceum

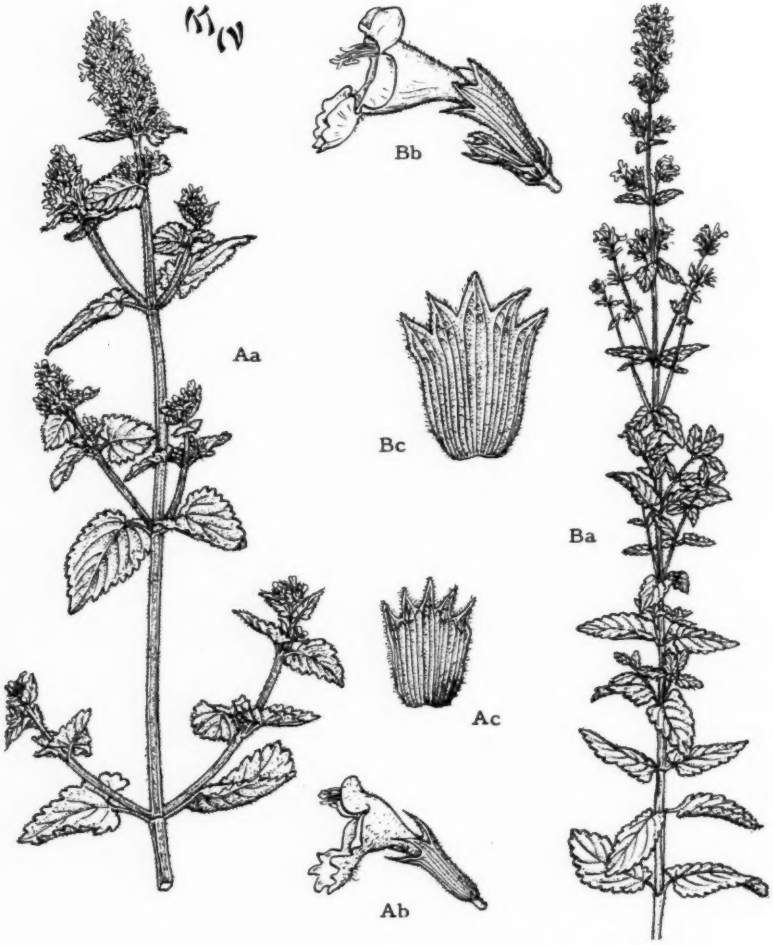

Fig. 39. A, Nepeta Cataria: a, habit x 1/4; b, flower x 3; c, calyx expanded x 3. B, N. grandiflora: a, habit x 1/6; b, flower x 2; c, calyx expanded x 3.

Notes on Cultivated Labiates

6. Nepeta

Gordon P. DeWolf, Jr.

One of the prime considerations facing any taxonomist is the necessity for defining the categories with which he works. This is the more important since in different groups of plants the same character may have differing values. Thus, in the labiates, the calyx affords characters of generic significance, while in the Solanaceæ, a family of plants in the same general circle of relationships, the calyx affords characters of generic (as in Physalis) or only specific (as in Solanum itself) value.

When I began a study of the cultivated species of the genus Nepeta I was confronted with a number of species, native in eastern Asia, which by some authors were included in Nepeta, but by others were placed in the allied genus Dracocephalum. Since several of these species are cultivated, it became necessary to circumscribe the two genera involved so that the taxonomic and nomenclatural disposition of the species might be settled.

An historical survey of the problem indicated that, though a number of authors had described new species in these genera in late years, no one had published a thorough study of the genera on a comprehensive basis since the treatment by George Bentham for DeCandolle's "Prodromus" in 1848. While it is true that a number of modern generic descriptions for these taxa do exist, they are based on the study of floras of limited areas and do not account for the range of variation in the genera treated as wholes.

As published by Linnæus in the first edition of the "Species Plantarum" of 1753, both Nepeta and Dracocephalum contained extraneous elements. Linnæus' generic characterizations of the two genera are not particularly critical, and we are, therefore, left to infer his concepts from the species which he included. Fortunately, this is not too difficult to do - and, equally fortunately, there has been substantial agreement among the various students of the group down through the years.

In the 75 years following the publication of the first edition of the "Species Plantarum," a number of new species in Nepeta were described, based primarily on the continuing exploration of Russian

Asia and southern Europe. In 1832 - 36, when Bentham published his "Labiatarum Genera et Species," the number of species had increased from the 12 known to Linnæus in 1753 to 59, and by 1848, when Bentham again treated the family for DeCandolle's "Prodromus," the number had risen to 113. Today, after the explorations of the last half of the 19th century in southeastern Asia and China, the number of species is estimated at 190. While there are certain problems of systematics involved among the species treated by Bentham, the confusion between the genera Nepeta and Dracocephalum did not come to a head until the introduction of the species from the eastern Himalayas and China.

In 1832 - 36 Bentham distinguished Dracocephalum as having either a bilabiate calyx, or the median posterior calyx-tooth ovate (expanded), or broad floral bracts with subulate teeth. Nepeta was distinguished by its having none of these characters. Sixty years later, in 1895, John Briquet tried to separate the two genera on the basis of the bilabiate nature of the calyx alone. He was not particularly successful. Other authors have attempted to distinguish the two genera on the basis of the form of cutting and lobation of the corolla - poor characters at best. Finally, throughout the history of the two genera there has been an uncritical tendency to place "large"-flowered species in Dracocephalum and "small"-flowered species in Nepeta.

Having now stated the problem, I should like to offer my own solution. Of the various definitions proposed, Bentham's, with some modification and amplification, seems the most useful.

The principal problem seems to have arisen over the definition and interpretation of the bilabiate calyx. In Nepeta ucranica (fig. 42B), for instance, the calyx-mouth is perfectly plane and the teeth are equal. In Nepeta Cataria (fig. 39A), on the other hand, the calyx-teeth are only sub-equal and there is developed a slight obliquity of the calyx-mouth. In Nepeta grandiflora (fig. 39B) the obliquity of the calyx-mouth is very pronounced, and the calyx-teeth, though similar in size, become somewhat dimorphic as regards the amount of curvature. Finally, in such species as N. sibirica (= Dracocephalum sibiricum; N. macrantha) (fig. 42A) the three posterior (upper) teeth are separated from the two anterior (lower) teeth by an emargination or "bay" on each side, forming a distinctly bilabiate calyx. The three posterior teeth appear to be fused at the base, and the lateral teeth are curved.

In Dracocephalum the calyx-teeth may or may not be strongly dimorphic (the posterior teeth differing from the anterior teeth in size or form). The calyx may be bilabiate by virtue of the dimorphism of the teeth or by the presence of a cleft separating the posterior from the anterior teeth (fig. 41C), or the calyx may be scarce-

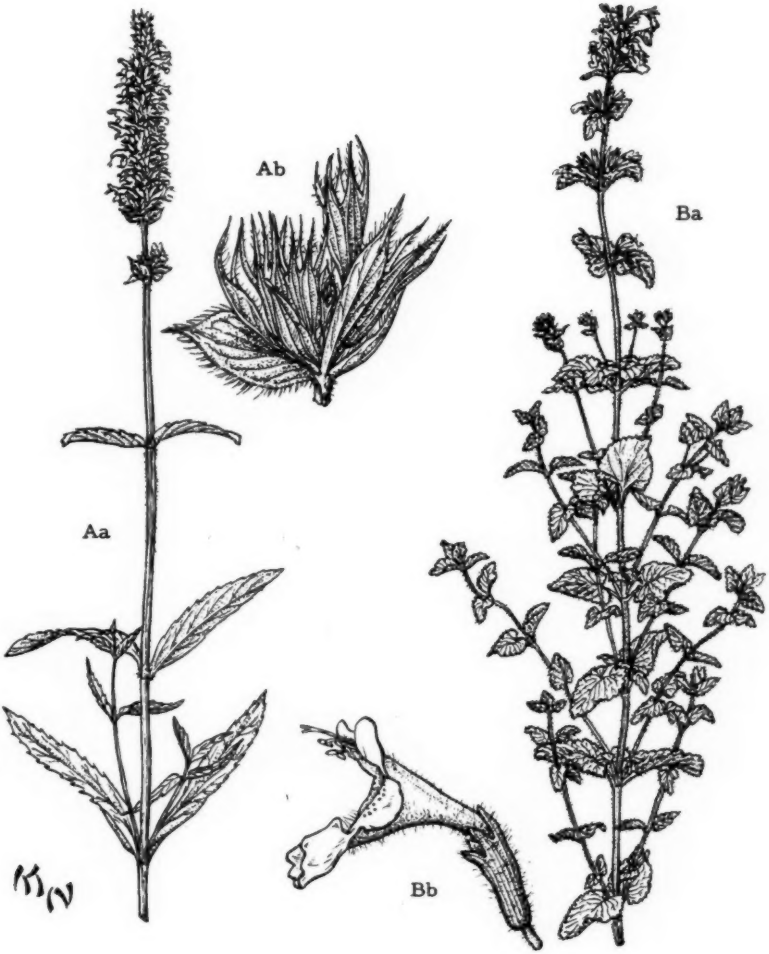

Fig. 40. A, Nepeta nervosa: a, habit x 1/4; b, verticil showing calyces x 3. B, N. Mussinii: a, habit x 2/5; b, flower x 3.

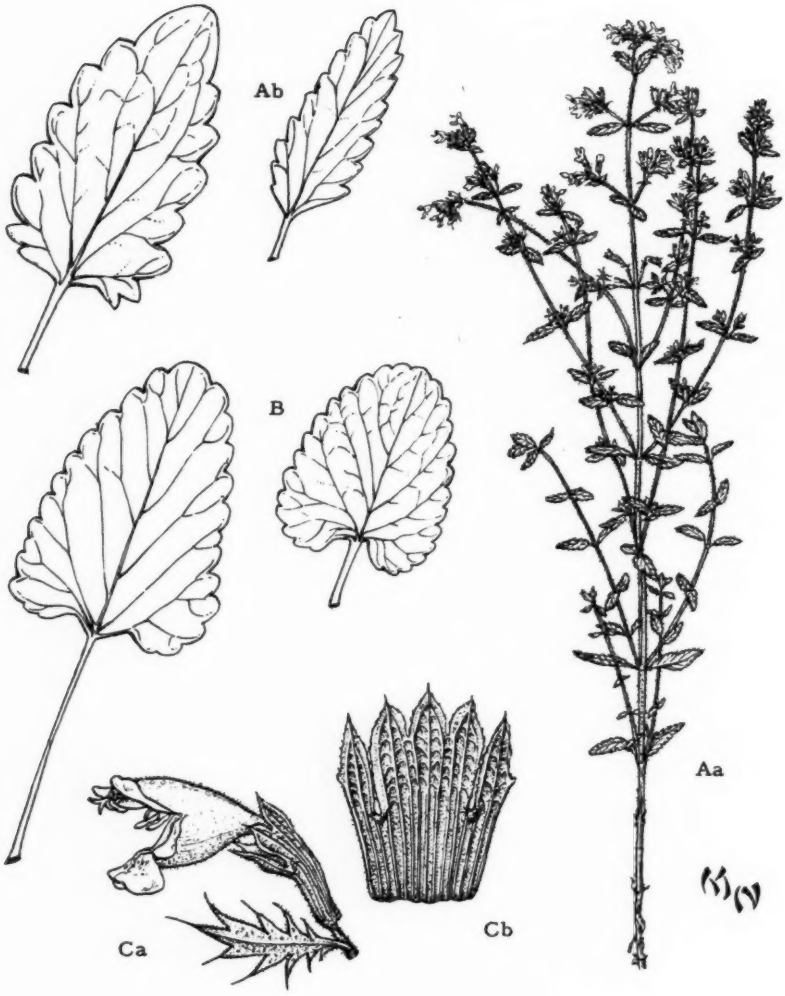

Fig. 41. A, Nepeta x Faassenii: a, habit x 2/5; b, leaves x 2 1/2. B, N. Mussinii, leaves x 2 1/2. C, Dracocephalum moldavicum: a, flower and bract x 2; b, calyx expanded x 3.

ly bilabiate at all. On the other hand, the calyx-teeth in Dracocephalum almost always have three conspicuous longitudinal veins, with conspicuous connecting veins (fig. 41Cb). Also, at the base of the sinuses between the teeth there is a conspicuous thickening or "shoulder" (fig. 41Cb) which is almost universally present.

I would, therefore, modify Bentham's diagnosis of Dracocephalum, and the concommitant contrast with Nepeta, by eliminating the discussion of the bilabiate nature of the calyx. I would amplify his diagnosis by adding a notation concerning the presence of a "shoulder" or callus at the base of the sinus between the calyx teeth. I would tabulate the distinctions between the two genera as follows:

Dracocephalum	Nepeta
At least the median posterior calyx-tooth generally expanded; if not, the calyx-teeth relatively broad, with 3 longitudinal veins, the cross veins conspicuous.	Median posterior calyx-tooth never expanded, the cross veins of the calyx-teeth not conspicuous without considerable magnification.
Calyx-teeth straight, or essentially so.	Lateral calyx-teeth frequently curved.
Mouth of the calyx plane or slightly oblique.	Mouth of the calyx ranging from plane to strongly oblique.
"Shoulder" at the base of the calyx-teeth.	No such shoulder present.
Bracts frequently pinnately divided, with apiculate tips, or subulately toothed.	Bracts entire, with or without a terminal apicule.

Nepeta Cataria Linnæus, the catnip (fig. 39A), is perhaps the most familiar species of Nepeta, so well known in fact, that comment is superfluous. Some of its close relatives, however, have posed problems in identification, and still go under assumed names in American gardens, and so call for comment here.

For somewhat over 100 years it has been known to botanists and horticulturists that all was not well with the plants that were passing under the name Nepeta Mussinii. The true species (fig. 40B) was introduced into western Europe from the Caucasus about 1803 by the Russian explorer Count Apollos Apollosovich Mussin-Pushkin. The taxon was formally described from plants growing in the Botanic Garden at Halle by a student of Kurt Sprengel in 1806. The original species, which propagates readily by seed, is a low (not more than 30 cm. tall), rather diffuse plant with gray-pubescent, cordate-ovate leaves (fig. 41B).

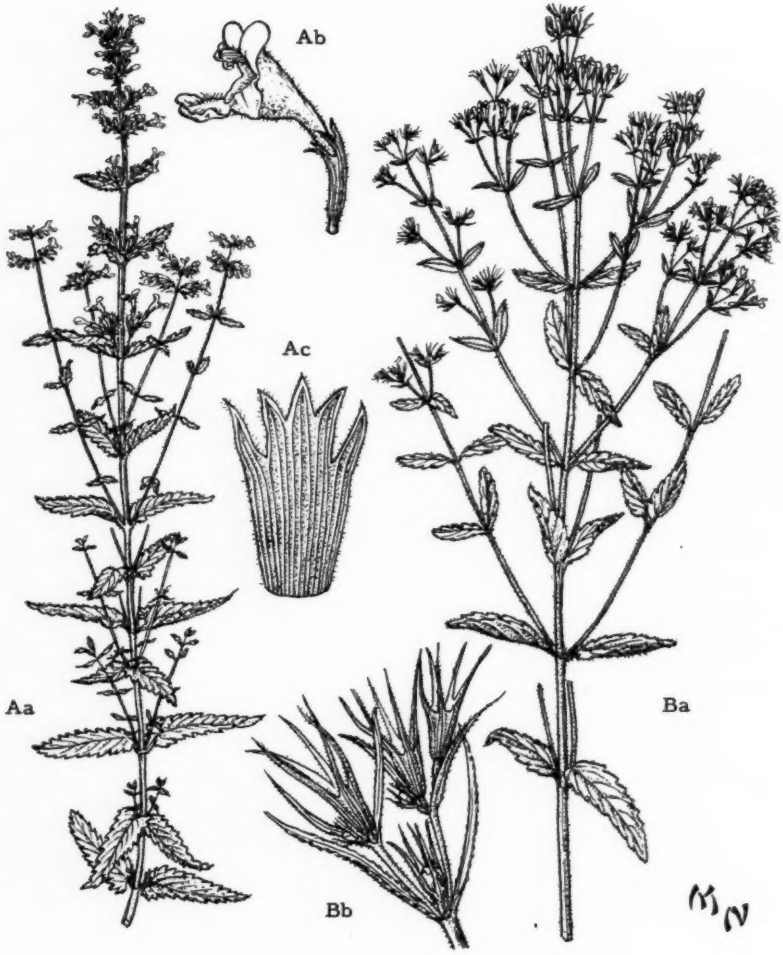

Fig. 42. A, Nepeta sibirica: a, habit x 1/6; b, flower x 1; c, calyx expanded x 3. B, N. ucranica: a, habit x 1/4; b, verticil showing calyces x 3.

In 1891, however, there appeared an article in the French horticultural journal "Revue Horticole," accompanied by a colored illustration, describing "Nepeta Mussinii" - but this was a different plant from that which had been grown in the Botanic Garden at Halle earlier in the century. This spurious N. Mussinii, which is now recognized nomenclaturally as N. ×Faassenii Bergmans ex Stearn (fig. 41A), differs from the true N. Mussinii Sprengel ex Henchel in its more strict and erect habit and in the shape of its leaves, which are narrowly ovate or lanceolate, with a more or less cuneate base (fig. 41Ab). It is sterile, and may be propagated by asexual means only. In this area it seems to be a less robust plant than N. Mussinii. At the present writing, May 10, a plant of N. Mussinii has been in bloom for more than a week, while other species of Nepeta have only just begun to put forth new shoots.

In 1944 E. V. Floto, Assistant Curator of the Botanical Garden at Copenhagen, published the first of two papers dealing with the taxonomy and cytology of "Nepeta Mussinii." Floto found that there were two distinct taxa passing under the name in Denmark - apparently the same two that have been confused in England and the United States. Though hybrid progeny were not raised experimentally, Floto believed that the second parent of N. ×Faassenii was N. nepetella, a rather nondescript species from southern Europe.

As early as 1832-36, Bentham had noticed that hybrids of Nepeta Mussinii were wide-spread in cultivation. He suggested that N. grandiflora Bieberstein was the second parent. While it is true that much of the hybrid material in cultivation today is referable to N. ×Faassenii, there are several specimens in the Bailey Hortorium collections which appear to represent plants intermediate in character between N. Mussinii and N. grandiflora. They have the calyx shaped as in N. grandiflora, but pubescent as in N. Mussinii; they have the leaf of N. Mussinii, and appear to be intermediate in height between the two putative parents.

There is a good deal of variation in plants which appear to be N. ×Faassenii, and it appears that careful breeding studies with N. Mussinii, N. nepetella, and N. grandiflora will be necessary before we can be sure of the exact status of these various clones.

Nepeta grandiflora (fig. 39B) is a robust species, up to 1 meter tall, with a branching inflorescence. Much of the material in the trade under this name, however, belongs to the related N. melissæfolia Lamarck. The two species may be distinguished as follows:

N. grandiflora	N. melissæfolia
Plants to 1 m. tall.	Plants 30 - 45 cm. tall.
Leaves glabrous or at most glabrescent.	Leaves distinctly pubescent.
Corolla more than 13 mm. long.	Corolla less than 13 mm. long.

Nepeta grandiflora has also been offered as N. reticulata. This species, however, belongs to a group of circum-Mediterranian species with dense spicate inflorescences, none of which seem to be in cultivation.

Nepeta raphanorhiza Bentham and N. nervosa Royle ex Bentham are related species from the western Himalayas. Nepeta raphanorhiza has a distribution extending from Kashmir to Afghanistan. It has a woody root-stock, more or less globose and radish-shaped, hence the specific name. The stems of the specimens I have seen seem to be weak, and 15 - 45 cm. tall. The inflorescence is spicate, ovoid, 2.5 cm. long or less. Nepeta nervosa (fig. 40A) has a similar inflorescence which may be as much as 8 cm. long. The plants have a woody elongate root-stock, and stems which grow to 60 cm. tall.

In 1753 Linnæus published in the "Species Plantarum" a taxon which he called Nepeta sibirica. This was based, at least in part, on a plate in J. C. Buxbaum's "Plantarum minus cognitarum Centuria III" of 1729. In 1759, in the second volume of the 10th edition of the "Systema Naturæ," he transferred the species to the genus Dracocephalum, with a reference back to the original publication in the "Species Plantarum," ed. 1. In 1763, in the second volume of the second edition of the "Species Plantarum," (which was reprinted the next year to form the so-called 3rd edition) the taxon was maintained in Dracocephalum, but reference to its earlier publication in the first edition was dropped.

Nepeta sibirica Linnæus (fig. 42A) is listed as a valid name in the "Index Kewensis," the standard nomenclator for angiosperm taxonomy. It is a name, however, that is not accounted for by George Bentham in either the "Labiatarum Genera et Species" or in the treatment in DeCandolle's "Prodromus." An examination of the page-references to the "Species Plantarum" cited by Bentham shows that he used either the second edition of 1763, or the reprint of the following year, hence he did not know of the publication of the name N. sibirica. He did know, however, that the plant called Dracocephalum sibiricum in the second and third editions of the "Species Plantarum" was in actuality a Nepeta. Consequently, he took up and validated for it a "nomen nudum" (literally, a naked name, i.e., a name published without a description) used in 1808 by Friedrich E. L. von Fischer in the catalogue of a private garden near Moscow. This is the name Nepeta macrantha Fischer ex Bentham.

The name Nepeta macrantha is one that is familiar in our gardens. The plant that we grow today is the same species that was known to Bentham, and to Linnæus before him. Its earliest and only legitimate name is, therefore, Nepeta sibirica. Apparently as a result of Bentham's authority, this name has been almost complete-

ly overlooked. Indeed, the only relatively complete synonymy for this species which I have seen is that given at p. 342 of the 20th volume of the "Flora URSS [Flora of the USSR]," published in 1954 in Moscow, but only recently available here.

Nepeta nuda Linnæus (Nepeta pannonica Linnæus) is a robust-growing species reaching 13 dm. in height, with a strict, branched inflorescence. The individual flowers are small, whitish or bluish, and scarcely exserted from the calyx-tube.

Nepeta ucranica Linnæus (fig. 42B) is a diffusely branched plant, the verticils with only a few flowers. It is immediately distinguished by the short urceolate calyx, with subulate teeth longer than the calyx-tube and exceeding the blue corolla.

Nepeta camphorata Boissier & Heldreich is a name which is in the trade, but of which I have seen no plants. According to authoritative descriptions of the species, it should be a low plant to 45 cm. tall, and heavily pubescent. The inflorescence is spicate, with the lower verticils somewhat distant from one another. It is a native of southern Greece.

In the next issue I will discuss the cultivated species of Dracocephalum, and provide a finding-list of names in the two genera.

HEMEROCALLIS LILIO-ASPHODELUS, THE YELLOW DAY-LILY

Every horticulturist and most botanists are familiar with the two commonest day-lilies, Hemerocallis flava and H. fulva. Both of these have been in cultivation in Europe for about 400 years, and are now naturalized and established as part of the wild flora in many of the longer-settled parts of temperate North America.

These two were the only true sorts of Hemerocallis known to Linnæus when he published the first edition of his "Species Plantarum" in 1753. (The plant he there called Hemerocallis Liliastrum he later renamed Anthericum Liliastrum; it is now known as Paradisea Liliastrum.) Linnæus at first treated these day-lilies as a single species, Hemerocallis Lilio Asphodelus, consisting of two varieties - i.e., H. Lilio Asphodelus α.[var.] flavus and H. Lilio Asphodelus β.[var.] fulvus - but in the second edition of "Species Plantarum" (1762) recognized them as two distinct species, naming them then H. flava and H. fulva. By these latter names these day-lilies have been known ever since.

It is most unfortunate, therefore, that the rules of botanical nomenclature require that the common yellow or lemon day-lily bear the cumbersome name Hemerocallis Lilio-asphodelus rather than the long-familiar H. flava. Article 63 of the present International Code of Botanical Nomenclature states, "When a species is

divided into two or more species, the specific epithet must be retained for one of them, or (if it has not been retained) must be reinstated...." Of the two species into which Linnæus divided his original H. Lilio Asphodelus, one, then, must bear the original specific epithet. This principle was recognized and applied to this situation by Nils Hylander in 1945, in his "Nomenklatorische und Systematische Studien über Nordische Gefässpflanzen" [Nomenclatural and Systematic Studies of Northern Vascular Plants], page 112 (Uppsala Universitets Årsskrift, vol. 7 [1945]). Hylander retained the name H. Lilio-asphodelus for Linnæus' α. flavus (later H. flava); when full author-citation is used with the name, it should be referred to as Hemerocallis Lilio-asphodelus L. emend. Hylander, meaning that Linnæus [L.] was the original author of the name, but that its application and circumscription have been modified (emended) by Hylander to include only one of the two entities originally included under that name by Linnæus. The name H. fulva is still the valid name for Linnæus' H. Lilio Asphodelus β. fulvus, the orange or tawny day-lily.

The present article calls attention to this name-change because both horticulturists and botanists writing in the decade since 1945 seem to have failed to recognize the necessity for the change and probably have not been aware of Hylander's action informally making the change, since the publication in which his work was published is not very generally available in this country. The now invalid name, H. flava, was still used for the yellow day-lily in such recent horticultural works as P. G. Corliss' "Hemerocallis" (1951), B. A. Davis' "Daylilies and How to Grow Them" (1954), and the "R. H. S. Dictionary of Gardening" (1951), and in botanical works such as the "New Britton and Brown Illustrated Flora" (1952) and the eighth edition of "Gray's Manual of Botany" (1950).

The gender of the name Hemerocallis deserves a note here, too. In the classical Latin (hemerocalles) and Greek forms of this word, the gender was neuter. In the first edition of the "Species Plantarum," Linnæus treated Hemerocallis as masculine, as is indicated by the masculine epithets flavus and fulvus, but in the second edition he used the feminine forms flava and fulva. The present code of nomenclature mentions the generic name specifically in Recommendation 83A, which concerns the gender of names, "Hemerocallis....should also be treated as feminine in order to bring it into conformity with all other generic names ending in -is," and this is the general practice. The specific epithet Lilio-asphodelus, however, is a noun (an old pre-Linnæan name for Hemerocallis) and not an adjective like flavus or fulvus, and so it retains its masculine form even though it is coupled with the quasi-feminine Hemerocallis (see "Baileya" 3, pp. 60, 61).

W. J. Dress

ABBREVIATIONS USED IN BAILEYA

[Excluding abbreviations of author's names following binomials etc.]

ann.	annual	dm.	decimeter	lf.	leaf
bien.	biennial	fl.	flower	lft.	leaflet
br.	branch	fls.	flowers	lvs.	leaves
brt.	branchlet	flt.	floret	mm.	millimeter
caps.	capsule	fr.	fruit	per.	perennial
cl.	clone	ft.	foot	segm.	segment
cm.	centimeter	hort.	horticultural	st.	stem
cv.	cultivar	in.	inch	sts.	stems
diam.	diameter	infl.	inflorescence	var.	variety

METRIC - ENGLISH EQUIVALENTS (approximate)

6 mm. - 1/4 in.	10 cm. - 4 in.	10 mm. - 1 cm.
12 mm. - 1/2 in.	1 dm. - 4 in.	10 cm. - 1 dm.
25 mm. - 1 in.	3 dm. - 1 ft.	10 dm. - 1 meter
2.5 cm. - 1 in.	10 dm. - 1 yd.	
5 cm. - 2 in.	1 m. - 39 in.	